CLAIMS

1. Method for the registration of images by iterative determination of an optimum transformation with respect to a predetermined distance and smoothness criterion, characterized in that control points corresponding in the images can be imaged on one another in guaranteeable manner, by

(1) initialization of an iteration counter and the initial displacement field,

(2) determining the numeral solutions of the nonlinear, partial differential equation (PDE) with the differential operator derivable from a predetermined smoothness criterion and the point evaluation functionals located at the predetermined control points,

(3) combining the interpolation conditions,

(4) calculating a specific, numerical solution of the PDE with the force determined on the basis of the distance criterion and the actual displacement field and the differential operator derived from the smoothness criterion,

(5) evaluating the specific solution at the control points,

(6) determining the coefficients for calculating an updated displacement,

(7) updating the displacement field and raising the iteration counter,

(8) checking the displacement for convergence and

(9) in the case of nonfulfilment of the convergence criterion, repetition of steps (4) to (8).

2. Method according to claim 1, characterized in that one, two or three-dimensional objects, as well as sequences of one, two and three-dimensional objects are registered.

3. Method according to one of the preceding claims, characterized in that the control points are anatomical landmarks, fiducial markers or other characteristic quantities.

4. Method according to one of the preceding claims, characterized in that the distance criterion is based on intensity, edge, corner, surface normal or level set or on the sum of square differences, L_2 distance, correlation, correlation variants, mutual information or mutual information variants.

5. Method according to one of the preceding claims, characterized in that the force terms associated with the distance quantity are calculated by means of finite difference methods or gradient formation.

6. Method according to one of the preceding claims, characterized in that the smoothness criterion used is physically motivated by means of an elastic potential or a fluid approach or on diffusive or curvature approaches based on time or space derivatives.

7. Method according to one of the preceding claims, characterized in that the boundary conditions of the differential operator are explicit or implicit, Neumann, Dirichlet, sliding, bending or periodic boundary conditions.

8. Method according to one of the preceding claims, characterized in that the nature of the discretization of the differential operator is based on finite differences, finite volume, finite elements, Fourier methods, series expansions, filter techniques, collocations or multigrid.

9. Method according to one of the preceding claims, characterized in that the interpolation is performed d-dimensionally by means of splines or wavelets.

10. Method according to one of the preceding claims, characterized in that the displacement is explicitly updated by means of the increment of the displacement or its time derivative.